

DRAWINGS ATTACHED

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(54) IMPROVEMENTS RELATING TO CONVEYOR SYSTEMS

(71) We, MOLINS MACHINE COMPANY LIMITED, a British Company, of 2, Evelyn Street, Deptford, London, S.E.8, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is concerned with feeding materials and articles on conveyors. More especially it is concerned with feeding cigarettes and other rod-like articles (and especially light articles like cigarettes) in stack formation on a conveyor in relation to which the articles lie transversely. In the case of cigarettes, this invention may in particular be used to convey cigarettes from one or more cigarette making machines to one or more cigarette packing machines.

A conveyor system according to this invention comprises a conveyor arranged to carry articles or material along a path extending to and fro in a number of passes between a stationary guide assembly and a movable guide assembly which can be moved to different distances from the stationary guide assembly, and the system also includes means for taking in or letting out conveyor material while the movable guide assembly is moving towards or away from the stationary guide assembly, as the case may be.

Movement of the movable guide assembly towards or away from the stationary guide assembly varies the length of the conveyor in what may be termed the "reservoir" part of the conveyor system. In use, while goods are delivered from the system at the output end at the same speed as goods are delivered to the system, the movable guide assembly will remain stationary. However, when the rate of delivery of goods to the input end of the system exceeds the rate of withdrawal at the output end, the movable guide assembly preferably moves automatically away from the stationary guide assembly so as to absorb the excessive input of goods within the reservoir, while maintaining the required delivery at the output end of the system. Conversely, while the rate of de-

livery to the input end of the system is less than the rate of delivery from the output end, the reservoir capacity automatically contracts so as to reduce the reservoir capacity and maintain the required output delivery.

In the case of cigarettes, the height of the stack preferably remains fixed throughout the conveyor system. This may be contrasted with the arrangement described in British Patent No. 995,663, in which a relatively low stack of cigarettes is fed into a reservoir consisting of two passes of variable length of a much deeper stack.

One example of a conveyor system according to this invention is shown in the accompanying drawings. In these drawings:—

Figure 1 is a diagrammatic side view of the systems; and

Figure 2 is a diagrammatic plan view.

The conveyor system shown in the drawings consists of an input conveyor 10 which delivers a stack 11 of cigarettes, preferably of approximately 3 inches to 4 inches height, an output conveyor 12, and a variable capacity reservoir section shown generally as 13. The reservoir section 13 includes a conveyor 14 which receives the stack of cigarettes from the conveyor 10 and finally delivers the stack to the conveyor 12. In the arrangement illustrated, it is necessary for the conveyor 14 to be capable of lateral curving, for which purpose the conveyor may be like the laterally flexible conveyor shown and described in British Patent Specification No. 54034/68 (Serial No. 1,251,217).

The path of the conveyor 14 is shown for convenience mainly by a chain-dotted centre line. This rises in a deep flat-sided helix which at one end passes round a stationary guide assembly shown diagrammatically as a column 15, and at the other end round a movable guide assembly shown diagrammatically as a column 16. This rising helix has five passes 17 which extend between the stationary and movable guide assemblies and are accordingly variable in length, depending upon the position of the movable guide assembly of which a second possible

position is shown in dotted outline. The path of the conveyor 14 then has a top pass 18 and finally descends in a downward helix including four passes 19 which extend between the stationary and movable guide assemblies and are accordingly variable in length. At the bottom the path of the conveyor 14 has a section 20 which avoids the movable guide assembly and extends to the junction with the conveyor 12.

It will be seen that there are ten passes, namely five passes 17, one pass 18 and four passes 19, which are variable in length. Accordingly, any given movement of the movable guide assembly towards or away from the stationary guide assembly produces a ten-fold change in the length of the reservoir conveyor 14. After delivering the cigarette stack to the conveyor 12, and before receiving the input stack from the conveyor 10, the conveyor 14 passes through a device 21 which acts in effect as a conveyor material reservoir in that it lets out or takes in conveyor material as necessary.

As an alternative, the parts of the conveyor 14 which pass round the guide assemblies may be formed by laterally curvable individual conveyors, or by rings of conveyor material bent round guide rollers so as to be capable of carrying the cigarette stack through the necessary semi-circular path. Between these end parts of the conveyor, there may be separate conveyor sections which may be conventional band conveyors (e.g. one for each variable-length pass of the conveyor 14) each with its own conveyor material reservoir.

The drive of the movable guide assembly may, for example, be by a variable speed motor driving via a screw jack.

WHAT WE CLAIM IS:—

1. A conveyor system for conveying

cigarettes or other articles or material, comprising a conveyor arranged to carry the articles or material along a path extending to and fro in a number of passes between a stationary guide assembly and a movable guide assembly which can be moved to different distances from the stationary guide assembly, and including means for taking in or letting out conveyor material while the movable guide assembly is moving towards or away from the stationary guide assembly, as the case may be.

2. A system according to claim 1 in which the conveyor extends along a vertically extending helical path around the stationary and movable guide assemblies, the movable guide assembly being horizontally movable to vary the length of the path as seen in a plan view.

3. A system according to claim 1 or claim 2 in which the conveyor comprises a continuous conveyor of a construction such that it can curve laterally.

4. A plant for making and packing cigarettes, comprising at least one cigarette making machine and at least one cigarette packing machine to which the cigarettes are delivered from the making machine by means of a conveyor system according to any one of claims 1 to 3.

5. A conveyor system according to claim 1 and substantially in accordance with any one of the examples described in the foregoing specification.

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